

(b)  $M^1_a M^2_b O_x$  is selected from the group consisting of  $Al_a Cr_b O_x$ ,  $Al_a Fe_b O_x$ ,  $Al_a Mg_b O_x$ ,  $Al_a Ni_b O_x$ ,  $Al_a Ti_b O_x$ ,  $Al_a V_b O_x$ ,  $Ba_a Cu_b O_x$ ,  $Ba_a Sn_b O_x$ ,  $Ba_a Zn_b O_x$ ,  $Bi_a Ru_b O_x$ ,  $Bi_a Sn_b O_x$ ,  $Bi_a Zn_b O_x$ ,  $Ca_a Sn_b O_x$ ,  $Ca_a Zn_b O_x$ ,  $Cd_a Sn_b O_x$ ,  $Cd_a Zn_b O_x$ ,  $Ce_a Fe_b O_x$ ,  $Ce_a Nb_b O_x$ ,  $Ce_a Ti_b O_x$ ,  $Ce_a V_b O_x$ ,  $Co_a Cu_b O_x$ ,  $Co_a Ge_b O_x$ ,  $Co_a La_b O_x$ ,  $Co_a Mg_b O_x$ ,  $Co_a Nb_b O_x$ ,  $Co_a Pb_b O_x$ ,  $Co_a Sn_b O_x$ ,  $Co_a V_b O_x$ ,  $Co_a W_b O_x$ ,  $Co_a Zn_b O_x$ ,  $Cr_a Cu_b O_x$ ,  $Cr_a La_b O_x$ ,  $Cr_a Mn_b O_x$ ,  $Cr_a Ni_b O_x$ ,  $Cr_a Si_b O_x$ ,  $Cr_a Ti_b O_x$ ,  $Cr_a Y_b O_x$ ,  $Cr_a Zn_b O_x$ ,  $Cu_a Fe_b O_x$ ,  $Cu_a Ga_b O_x$ ,  $Cu_a La_b O_x$ ,  $Cu_a Nb_b O_x$ ,  $Cu_a Ni_b O_x$ ,  $Cu_a Pb_b O_x$ ,  $Cu_a Sn_b O_x$ ,  $Cu_a Sr_b O_x$ ,  $Cu_a Ti_b O_x$ ,  $Cu_a Zn_b O_x$ ,  $Cu_a Zr_b O_x$ ,  $Fe_a Ga_b O_x$ ,  $Fe_a La_b O_x$ ,  $Fe_a Mo_b O_x$ ,  $Fe_a Nb_b O_x$ ,  $Fe_a Ni_b O_x$ ,  $Fe_a Sn_b O_x$ ,  $Fe_a Ti_b O_x$ ,  $Fe_a W_b O_x$ ,  $Fe_a Zn_b O_x$ ,  $Fe_a Zr_b O_x$ ,  $Ga_a La_b O_x$ ,  $Ga_a Sn_b O_x$ ,  $Ge_a Nb_b O_x$ ,  $Ge_a Ti_b O_x$ ,  $In_a Sn_b O_x$ ,  $K_a Nb_b O_x$ ,  $Mn_a Nb_b O_x$ ,  $Mn_a Sn_b O_x$ ,  $Mn_a Ti_b O_x$ ,  $Mn_a Y_b O_x$ ,  $Mn_a Zn_b O_x$ ,  $Mo_a Pb_b O_x$ ,  $Mo_a Rb_b O_x$ ,  $Mo_a Sn_b O_x$ ,  $Mo_a Ti_b O_x$ ,  $Mo_a Zn_b O_x$ ,  $Nb_a Ni_b O_x$ ,  $Nb_a Nb_b O_x$ ,  $Nb_a Sr_b O_x$ ,  $Nb_a Ti_b O_x$ ,  $Nb_a W_b O_x$ ,  $Nb_a Zr_b O_x$ ,  $Ni_a Si_b O_x$ ,  $Ni_a Sn_b O_x$ ,  $Ni_a Y_b O_x$ ,  $Ni_a Zn_b O_x$ ,  $Ni_a Zr_b O_x$ ,  $Pb_a Sn_b O_x$ ,  $Pb_a Zn_b O_x$ ,  $Rb_a W_b O_x$ ,  $Ru_a Sn_b O_x$ ,  $Ru_a W_b O_x$ ,  $Ru_a Zn_b O_x$ ,  $Sb_a Sn_b O_x$ ,  $Sb_a Zn_b O_x$ ,  $Sc_a Zr_b O_x$ ,  $Si_a Sn_b O_x$ ,  $Si_a Ti_b O_x$ ,  $Si_a W_b O_x$ ,  $Si_a Zn_b O_x$ ,  $Sn_a Ta_b O_x$ ,  $Sn_a Ti_b O_x$ ,  $Sn_a W_b O_x$ ,  $Sn_a Zn_b O_x$ ,  $Sn_a Zr_b O_x$ ,  $Sr_a Ti_b O_x$ ,  $Ta_a Ti_b O_x$ ,  $Ta_a Zn_b O_x$ ,  $Ta_a Zr_b O_x$ ,  $Ti_a V_b O_x$ ,  $Ti_a W_b O_x$ ,  $Ti_a Zn_b O_x$ ,  $Ti_a Zr_b O_x$ ,  $V_a Zn_b O_x$ ,  $V_a Zr_b O_x$ ,  $W_a Zn_b O_x$ ,  $W_a Zr_b O_x$ ,  $Y_a Zr_b O_x$ ,  $Zn_a Zr_b O_x$ ,  $Al_a Ni_b O_x$  with frit additive,  $Cr_a Ti_b O_x$  with frit additive,  $Fe_a Ni_b O_x$  with frit additive,  $Fe_a Ti_b O_x$  with frit additive,  $Nb_a Ti_b O_x$  with frit additive,  $Nb_a W_b O_x$  with frit additive,  $Ni_a Zn_b O_x$  with frit additive,  $Ni_a Zr_b O_x$  with frit additive, or  $Ta_a Ti_b O_x$  with frit additive; and/or

(c)  $M^1_a M^2_b M^3_c O_x$  is selected from the group consisting of  $Al_a Mg_b Zn_c O_x$ ,  $Al_a Si_b V_c O_x$ ,  $Ba_a Cu_b Ti_c O_x$ ,  $Ca_a Ce_b Zr_c O_x$ ,  $Co_a Ni_b Ti_c O_x$ ,

5                    $\text{Co}_a\text{Ni}_b\text{Zr}_c\text{O}_x$ ,  $\text{Co}_a\text{Pb}_b\text{Sn}_c\text{O}_x$ ,  $\text{Co}_a\text{Pb}_b\text{Zn}_c\text{O}_x$ ,  
 $\text{Cr}_a\text{Sr}_b\text{Ti}_c\text{O}_x$ ,  $\text{Cu}_a\text{Fe}_b\text{Mn}_c\text{O}_x$ ,  $\text{Cu}_a\text{La}_b\text{Sr}_c\text{O}_x$ ,  
 $\text{Fe}_a\text{Nb}_b\text{Ti}_c\text{O}_x$ ,  $\text{Fe}_a\text{Pb}_b\text{Zn}_c\text{O}_x$ ,  $\text{Fe}_a\text{Sr}_b\text{Ti}_c\text{O}_x$ ,  
 $\text{Fe}_a\text{Ta}_b\text{Ti}_c\text{O}_x$ ,  $\text{Fe}_a\text{W}_b\text{Zr}_c\text{O}_x$ ,  $\text{Ga}_a\text{Ti}_b\text{Zn}_c\text{O}_x$ ,  
 $\text{La}_a\text{Mn}_b\text{Na}_c\text{O}_x$ ,  $\text{La}_a\text{Mn}_b\text{Sr}_c\text{O}_x$ ,  $\text{Mn}_a\text{Sr}_b\text{Ti}_c\text{O}_x$ ,  
 $\text{Mo}_a\text{Pb}_b\text{Zn}_c\text{O}_x$ ,  $\text{Nb}_a\text{Sr}_b\text{Ti}_c\text{O}_x$ ,  $\text{Nb}_a\text{Sr}_b\text{W}_c\text{O}_x$ ,  
 $\text{Nb}_a\text{Ti}_b\text{Zn}_c\text{O}_x$ ,  $\text{Ni}_a\text{Sr}_b\text{Ti}_c\text{O}_x$ ,  $\text{Sn}_a\text{W}_b\text{Zn}_c\text{O}_x$ ,  
 $\text{Sr}_a\text{Ti}_b\text{V}_c\text{O}_x$ ,  $\text{Sr}_a\text{Ti}_b\text{Zn}_c\text{O}_x$ , or  $\text{Ti}_a\text{W}_b\text{Zr}_c\text{O}_x$ .

10           42. An apparatus according to Claim 40 wherein the  
array is situated within the gas mixture, which has a  
temperature of about 400°C or more.

          43. An apparatus according to Claim 40 wherein the  
gas mixture is an emission from a combustion process.

15           44. An apparatus according to Claim 40 wherein the  
component gases in the gas mixture are not separated.

          45. An apparatus according to Claim 40 wherein the  
analysis is performed from the electrical responses of  
the chemo/electro-active materials upon exposure to the  
multi-component gas mixture only.

20           46. An apparatus according to Claim 40 wherein the  
means for performing analysis is means for calculating  
the concentration within the gas mixture of the  
individual gas component.

25           47. An apparatus according to Claim 40 further  
comprising means for determining a value for the  
temperature of the gas mixture connected in parallel  
circuitry with the chemo/elctro-active materials, and  
wherein the individual gas component is analyzed from  
digitized electrical responses and a digitized  
30   temperature value.

          48. An apparatus according to Claim 40 wherein the  
temperature of each chemo/electro-active material is  
determined substantially only by the variable  
temperature of the gas mixture.

35           49. An apparatus according to Claim 40 wherein at  
least one chemo/electro-active material, when at a  
temperature of about 400°C or more, (i) has an  
electrical resistivity in the range of about 1 ohm-cm

to about  $10^5$  ohm-cm, and (ii) exhibits a change in electrical resistance of at least about 0.1 percent upon exposure of the material to an individual gas component, as compared to the resistance before exposure.

50. An apparatus according to Claim 40 wherein the electrical response characteristic of each material upon exposure to the gas mixture at a selected temperature is quantifiable as a value, and the response value of at least one material is constant or varies by no more than about twenty percent during exposure of the material to an individual gas component at the selected temperature for a period of at least about one minute.

51. An apparatus according to Claim 40 wherein the electrical response is selected from the group consisting of resistance, impedance, capacitance, voltage or current.

52. An apparatus for analyzing at least one individual gas component in a multi-component gas mixture, comprising:

- (a) an array of at least two chemo/electro-active materials connected in parallel circuitry, each chemo/electro-active material having a different electrical response characteristic upon exposure at a selected temperature to the individual gas component than each of the other chemo/electro-active materials, the electrical response characteristic of each material being quantifiable as a value, wherein the response value of at least one material is constant or varies by no more than about twenty percent during exposure of the material to an individual gas component at the selected temperature for a period of at least about one minute;